

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No.: 10/029,204
Atty Docket No.: Q63141

REMARKS

The Office Action of April 4, 2003 has been received and its contents carefully considered.

The Examiner has not acknowledged applicants' claim for domestic priority to a provisional application. Applicants request the Examiner to acknowledge applicants' claim for domestic priority to a provisional application.

The Examiner objects to the Abstract, and requires that a new Abstract be provided. In response, applicants have provided a new Abstract as set forth above.

Claims 1-7, 9-11, 13, 14, 16-18, 20 and 21 have been rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,792,564 to Hikosaka et al.

Applicants submit that Hikosaka et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

The present invention, as set forth in claim 1 as amended above, relates to a magnetic recording medium comprising, in sequence, on a nonmagnetic substrate, at least one soft magnetic underlayer, an orientation control layer to control the orientation of the layer immediately above, and a perpendicular magnetic layer having an axis of easy magnetization which is oriented mainly perpendicularly to the nonmagnetic substrate. The soft magnetic underlayer has a multilayer structure having a plurality of soft magnetic layers comprising a soft magnetic material, and one or more separation layers interposed between the soft magnetic

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layers, and at least one of the soft magnetic layers comprises a material with a structure having no magnetic domain walls.

Applicants have amended claim 1 to recite that a direction of the magnetization of the soft magnetic layer is along the radius of said nonmagnetic substrate and is oriented towards the periphery of the substrate or towards the center of the nonmagnetic substrate. Applicants have cancelled claim 11 which contained these recitations. In amending claim 1, applicants have reformatted the claim by adding paragraphing.

In another aspect of the present invention, as set forth in claim 16 as amended above, a method is provided for producing a magnetic recording medium. Applicants have amended claim 16 by adding recitations from claim 18, which has been cancelled, to recite that a magnetization of the soft magnetic layer is directed along the radius of the nonmagnetic substrate towards the periphery or the center of the nonmagnetic substrate. In addition, applicants have amended claim 16 by reformatting claim 16 by adding paragraphing, and by adding “forming” steps.

In still another aspect of the present invention, as recited in claim 20 as amended above, the present invention is directed to a magnetic reproducing and recording device. Applicants have amended claim 20 to recite that at least one of the soft magnetic layers comprises a material with a structure having no magnetic domain walls, to thereby provide antecedent basis for recitations that appear in claim 21, and to recite that a direction of magnetization of the soft magnetic layer is along the radius of the magnetic substrate. In addition, applicants have reformatted claim 20 by adding paragraphing.

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Applicants have also amended the claims to place them in better form.

With respect to claims 1, 16 and 20, the Examiner relies on Figures 4 and 5 of Hikosaka et al and the disclosures relating thereto. The Examiner states that Figure 4 discloses a non-magnetic layer in the form of element 13, which the Examiner states is the same as applicants' "orientation control layer". Figure 4 of Hikosaka et al, however, does not contain an element 13. Instead, Figure 5 of Hikosaka et al contains an element 13 as a nonmagnetic layer. The Hikosaka et al patent does not describe this layer 13 in detail.

The Examiner argues that the recitation in the claims "to control the orientation of the layer immediately above" is an intended use limitation, and does not further limit the structure of the product. The Examiner states that if the prior art structure is capable of performing the intended use, then it meets the claim. The Examiner argues that since all layers affect the grain epitaxy of subsequently deposited layers, the element 13 is clearly capable of performing the intended use.

In view of the Examiner's assertion that an "orientation control layer" of the present invention is similar to the "nonmagnetic layer 13" of Hikosaka et al, applicants have amended claims 1 and 16 as discussed above, by incorporating recitations from claims 11 and 18, which have been cancelled. In addition, applicants have amended claim 20 as discussed above.

Hikosaka et al (USP 5,792,564) disclose that a perpendicular recording medium comprising an underlayer that has a multilayer structure formed of soft magnetic films and antiferromagnetic films (corresponding to a "separation layer" of the present invention). These antiferromagnetic films generate a bias magnetic field stronger than the coercivity of the adjacent

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soft magnetic film by virtue of the exchange coupling between the antiferromagnetic film and the adjacent soft magnetic film. In this case, "bias magnetic field" means a magnetic field generated at an antiferromagnetic coupling (exchange coupling). That is, the antiferromagnetic film produces the bias magnetic field.

In contrast, in the present invention, as set forth in the presently amended claims, the direction of magnetization of a soft magnetic layer is along the radius of a nonmagnetic substrate and is oriented towards the periphery of the substrate or towards the center of the nonmagnetic substrate. That is, the soft magnetic layer produces a magnetic field. Hikosaka et al do not disclose or suggest that the direction of magnetization of a soft magnetic layer is along the radius of a nonmagnetic substrate and is oriented towards the periphery of the substrate or towards the center of the nonmagnetic substrate.

With respect to the recitations of claims 9 to 11 and 18, the Examiner argues that the disclosed structure in Figure 5 of Hikosaka et al would inherently satisfy the recitations of these claims. The Examiner relies on the disclosure of column 10, lines 5-37, including lines 15-20, of Hikosaka et al, and the disclosure in the drawings of the Fullerton et al patent, and the portions of the Fullerton patent that he has underlined or circled, to arrive at his conclusion that Hikosaka et al inherently disclose the recitations of these claims.

Claims 9, 11 and 18 have been cancelled, and recitations from these claims have been incorporated into claims 1 and 16. As discussed above, Hikosaka et al do not disclose or suggest that the direction of magnetization of a soft magnetic layer is along the radius of a nonmagnetic

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substrate and is oriented towards the periphery of the substrate or towards the center of the nonmagnetic substrate.

Further, with respect to Fullerton et al applicants first note that the Examiner has not included this patent in the statement of the rejection. See MPEP §706.02 (j), which states that even if reference is relied on in a minor capacity, it should be positively included in the statement of the rejection.

In any event, Fullerton et al (USP 6,391,430 B1) disclose the existence of magnetic directions of soft magnetic layers in Fig. 1 etc. However, the Fullerton et al patent specification does not specify the magnetic directions. Therefore, in the Fullerton et al invention, it cannot be understood from the arrows in Fig. 1 etc., that the magnetic directions of the ferromagnetic films (22 and 24, Fig. 1) are along the radius of a substrate (11, Fig. 1) and are oriented towards the periphery of the substrate or towards the center of the substrate. Thus, Fullerton et al do not establish that the disclosures in Hikosaka et al would inherently satisfy the recitations of claims 1, 16 and 20 that the direction of magnetization of a soft magnetic layer is along the radius of a nonmagnetic substrate, and is oriented towards the periphery of the substrate or towards the center of the nonmagnetic substrate or the recitations of claim 10 which depends from claim 1.

In view of the above, applicants submit that Hikosaka et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claims 1, 3, 4, 8-11, 14, 16, 18 and 20 have been rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Application No. 2002/0028357 to Shukh et al.

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Applicants submit that Shukh et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection

In this rejection, the Examiner takes the position that spacer layer 42 of Shukh et al satisfies the recitations of the present claims for an orientation control layer, and that the recitation in the present claims of controlling “the orientation of the layer immediately above” is an intended use limitation, but does not further limit the structure of the present claims.

Shukh et al (USPA 2002/0028357A1) disclose the existence of magnetic directions of soft magnetic layers in Fig. 3. However, the Shukh et al patent specification does not specify the magnetic directions. Therefore, in the Shukh et al invention, it cannot be understood from the arrows in Fig. 3 that the magnetic directions of the soft magnetic layers (48, 50, 52 and 54) are along the radius of a substrate (38, Fig. 2) and are oriented towards the periphery of the substrate or towards the center of the substrate.

In view of the above, applicants submit that Shukh et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claim 8 has been rejected under 35 U.S.C. § 103(a) as obvious over Hikosaka et al and further in view of Shukh et al.

Claim 8 depends from claim 3, which depends from claim 1. Accordingly, applicants submit that claim 8 is patentable over these references for the same reasons as discussed above in connection with the rejections of claim 1 over these references.

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In view of the above, applicants submit that Hikosaka et al and Shukh et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claim 12 has been rejected under 35 U.S.C. § 103(a) as obvious over Hikosaka et al and further in view of Akiyama et al.

Claim 12 depends from claim 1. Accordingly, applicants submit that claim 12 is patentable over these references for the same reasons as discussed above in connection with the rejection of claim 1 over Hikosaka et al.

In view of the above, applicants submit that Hikosaka et al and Akiyama et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection

Claims 15 and 19 have been rejected under 35 U.S.C. § 103(a) as obvious over Hikosaka et al and further in view of Tang et al '270.

Claims 15 and 19 depend from claims 1 and 16, respectively. Accordingly, applicants submit that they are patentable for the same reasons as discussed above in connection with the rejection of claim 1 over Hikosaka et al.

In view of the above, applicants submit that Hikosaka et al and Tang et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection

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Claims 2, 5-7, 13, 15, 17, 19 and 21 have been rejected under 35 U.S.C. § 103(a) as obvious over Shukh et al and further in view of Tang et al '270.

Each of these claims depend ultimately from one of claims 1, 16 and 20. Accordingly, applicants submit that these claims are patentable for the same reasons as discussed above in connection with the rejection of claims 1, 16 and 20 over Shukh et al.

In view the above, applicants submit that Shukh et al and Tang et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claim 12 has been rejected under 35 U.S.C. § 103(a) as obvious over Shukh et al and further in view of Akiyama et al '342.

Claim 12 depends from claim 1. Accordingly, applicants submit that claim 12 is patentable over these references for the same reasons as discussed above in connection with the rejection of claim 1 over Shukh et al.

In view of the above, applicants submit that Shukh et al and Akiyama et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection

The Examiner states that the prior art made of record and not relied upon is pertinent to applicants' disclosure. In particular, the Examiner refers to the patents to Saito, Inturi et al, Fullerton et al, Kubota et al and Sugita et al.

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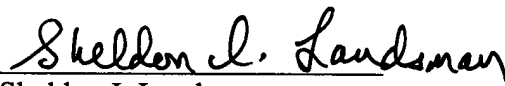
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Applicants note that although the Examiner states that he is not relying on any of these references, the Examiner has, in fact, relied on a number of these references such as Saito, Fullerton and Inturi et al. Applicants point out that the Examiner's reliance on these references without specifically including them in the statements of the rejections is not in accordance with the procedure set forth in the MPEP at §706.029(j).

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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